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(54) FIELD EMISSION DISPLAY DEVICE

SUMMARY

The present invention relates to a field emission display device. A field emission display device of the present invention includes: a front substrate and a rear substrate which are spaced apart by a predetermined interval so that a vacuum state may be maintained in the inside thereof; numerous cathode electrodes that are arranged in a stripe form on an inside surface of the rear substrate; a grid electrode having an electron passage hole formed in a pixel region above the cathode electrodes; a surface electron source disposed in the pixel region of the cathode electrodes so as to release electrons by a voltage difference between the cathode electrodes and the grid electrode; and an electric potential adjustment electrode disposed between the cathode electrodes so as to adjust the electric potential of the cathode so that the electric field of the electrons released from the surface electron source may be concentrated to a central part of the surface electron source. In the present invention such as described above, another field emission display device uses

the electric potential adjustment electrode to minimize the disappearance of electrons released from the surface electron source by colliding with the grid plate, and further uses the secondary electron releasing substance to let electrons be released and migrate to a fluorescent substance in a larger amount than the electrons that have disappeared, thereby producing an effect of improving the cathode efficiency and improving the operation stability of the display device to a greater extent as well as being capable of reducing the electric power consumption though having a high brightness.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a partially enlarged cross-sectional view of a conventional field emission display device.

Fig. 2 is an operation configuration view showing an electron migration state of a conventional field emission display device.

Fig. 3 is a partially enlarged cross-sectional view of a field emission display device according to the present invention.

Fig. 4 is an operation configuration view showing an electron migration state of a field emission display device according to the present invention.

Fig. 5 is an operation configuration view showing an electron migration state of a field emission display device according to another embodiment of the present invention.

<Description of symbols related to principal parts in the drawings>

100: front substrate

110: rear substrate

120: cathode substrate

130: surface electron source

150: grid plate

200: electric potential adjustment electrode

300: electron releasing substance

WHAT IS CLAIMED IS:

[Claim 1]

A field emission display device characterized by comprising:  
a front substrate and a rear substrate which are spaced apart by a predetermined interval so that a vacuum state may be maintained in the inside thereof;  
numerous cathode electrodes that are arranged in a stripe form on an inside surface of said rear substrate;  
a grid electrode having an electron passage hole formed in a pixel region above said cathode electrodes;  
a surface electron source disposed in the pixel region of said cathode electrodes so as to release electrons by a voltage difference between said cathode electrodes and said grid electrode; and  
an electric potential adjustment electrode disposed between said cathode electrodes so as to adjust said cathode electric potential so that the electric field of the electrons released from said surface electron source may be concentrated to a central part of said surface electron source.

[Claim 2]

A field emission display device according to claim 1, characterized in that said grid electrode is provided with a secondary electron releasing substance that releases secondary electrons from the electrons released from said surface electron source and colliding with said grid electrode.

[Claim 3]

A field emission display device according to any one of claims 1 to 2, characterized in that a spacer for spacing said grid electrode and said rear substrate apart from each other is disposed between said grid electrode and said rear substrate, and

said electric potential adjustment electrode is disposed between said spacer and said rear substrate.